



BODY MASS INDEX (BMI) AND CHRONIC ENERGY DEFICIENCY (CED) AMONG ADULT: A FIELD-BASED EXPERIENCE OF BHUMIJA FROM ODISHA, INDIA

Kalandi Singh¹, Dr. Prasanna Kumar Patra²

¹Ph.D Scholar (NFHE Fellow), PG Department of Anthropology, Utkal University, Vani Vihar-751004, Odisha, India.

² Associate Professor, PG Department of Anthropology, Utkal University, Vani Vihar-751004, Odisha, India.

ABSTRACT

Introduction: The present study attempts to examine the relationship between adult Bhumija's BMI and CED in Mayurbhanj District, Odisha, India. **Methods:** For the study total 275 respondents (men-133 and women-142) were selected from three villages those were over the age of 18-49 was investigated. **Results:** The male respondents average mean body mass index (BMI) were 138.8 (19.4) cm, 31.84 (12.1) kg, 18.14(3.3) cm, and 15.7 (2.3) kg/m², respectively. Females average mean BMI were 138.0 (19.2) cm, 31.7 (11.4) kg, 18.1 (3.2) cm, and 16.0 (2.3) kg/m² respectively. Among males belonged to the under-nutrition group, 79(28.7%) were CED III, 18(6.5%) were CED II, 16(5.8%) were CED I, and 23(8.4%) were normal. On the other hand among females 75(27.3%) were CED III, 27(9.8%) were CED II, 17(6.2%) were CED I, and 23(8.4%) were normal. As per the guidelines of the World Health Organization (WHO), the rate of under nutrition based on BMI and CED was high ($\geq 40\%$), indicating a serious nutritional condition. **Conclusion:** The study suggests that need-based and culturally appropriate socio-economic, educational and public health programs should be initiated among the Bhumija in order to reduce the prevalence of health condition among the Bhumija.

KEYWORDS: Bhumija, CED, BMI, Adult, Odisha.

INTRODUCTION:

The importance of health is an essential indicator of both financial development and growth. The health significance of specified residents is absolutely or harmfully partial to the nation's financial increase. Dependent health factors like income per capita, social infrastructure, diet, sanitation, medical care facilities, secure intake water, poverty, employment status, etc., change the health of each person and there is a link between development and health (Sharma; 2012). Higher risks of under-nutrition in the tribal population are due to the cultural, ecological, and socio-economic factors. Nutritional status is an essential tool to learn about health and depends on the use of foodstuffs relative to the requirements and necessities. Some studies have revealed a relationship between the ethnic group's dietary and economic status (Tiwari 2007; Rao & Rao 1994) and health outcomes. The nutritional and health status of the human inhabitants of any nation is determined through the value of economic growth. Usually, at the family circle level, cultural norms, socioeconomic factors and practice resolve the level of health issues in tribal people. The causes of diseases, poverty, illiteracy, unfriendly surroundings, lack of drinking water, poor sanitation, unsighted belief systems, etc. are consider as miseries among the tribal communities. The Bhumija are one of the Hindu tribes and are found largely in the district of Mayurbhanj. Etymologically, the term "Bhumija" means "one who is born from the soil." Dalton classifies the Bhumijas as Kolarians on linguistic grounds. Racially, they belong to the proto-australoids. Rishley says that the Bhumijas are nothing more than a branch of the Munda, which has spread to the east (Goswami et al 2009; Behera 2021).

Study area:

The present study focused on two villages in the Khunta block of Mayurbhanj District, Odisha. With a landmass of 10418 square kilometres, Mayurbhanj is Orissa's largest district. The district is home to the standardized biosphere and is rich in biodiversity. The district was placed 9 th in human development and has made significant improvement in literacy and other human development indicators in recent years. (DHDR, 2011).



Fig. 2: Map of Mayurbhanj District (Khunta Block)

METHODOLOGY:

For the study, primary data has been collected by adopting field survey method for collecting the data. In depth interviews and individual questionnaire were prepared for collection the data. The participant observations were conducted in three villages for verify the data in Khunta block of Mayurbhanj District, Odisha. The paper based on the secondary data obtained from various books, articles, journals, reports, research articles and unpublished reports so on. Field note were made by researcher to analysis the data. Audio records were done after getting permission from respondents.

Measurements of Anthropometric Traits:

Anthropometric measurements of each subject's height (cm), MUAC (cm), and weight (kg) using Lohman et al.'s methodology (1988) were taken. Weight and circumference were measured to the nearest 500 g, while circumference and height were measured to the nearest 1 mm.

Measurement of Nutritional Status:

Nutritional status was calculated by globally acknowledged Body Mass Index (WHO, 1995) guidelines:

CED III: BMI < 16.00 kg/m²

CED II: BMI = 16.0-16.9 kg/m²

CED I: BMI = 17.0-18.4 kg/m²

Normal: BMI = 18.5-24.9 kg/m²

Over weight: BMI = 25.0-29.9 kg/m²

We used the classification of World Health Organization's (1995) low BMI of the community physical condition dilemma in adult populations all above the world. This classification divides frequency into percentages of the populations with a BMI (<18.5 kg/m²).

Low (5 - 9%): warning sign, monitoring required.

Medium (10 - 19%): poor situation.

High (20 - 39%): serious situation.

Very high ($\geq 40\%$): critical situation.

Statistical Analysis:

SPSS software was used to analysis the data after the figures were assembled (V-20.00). Descriptive statistics is used to examine the mean, maximum, minimum, standard deviation, and percentiles. The sex difference in mean weight, height, BMI, and CED was determined using the Student's t-test. The Chi square test was used to determine the association between two variables. The impact level was set at 0.05.

RESULTS:

Table.1 shows the participants of sex wise the mean (SD) values of weight, height, and BMI for each participant. Males 31.8 (12.1) kg, 138.8 (19.4) cm, and

15.7 (2.3) kg/m² had a higher average height, weight and BMI than females 138.0 (19.2) cm, 31.7(11.4) cm and 16.0 (2.3) kg/m². The gender disparities were statistically significant (p 0.001).

Table1: Anthropometric Characteristics of the Bhumija

Variables	Male (n=133)		Female (n=142)	
	Mean	SD	Mean	SD
Height (cm)	138.83	19.48	138.0	19.22
Weight (kg)	31.84	12.11	31.75	11.49
BMI (kg/m ²)	15.78	2.36	16.0	2.32

*p<0.001

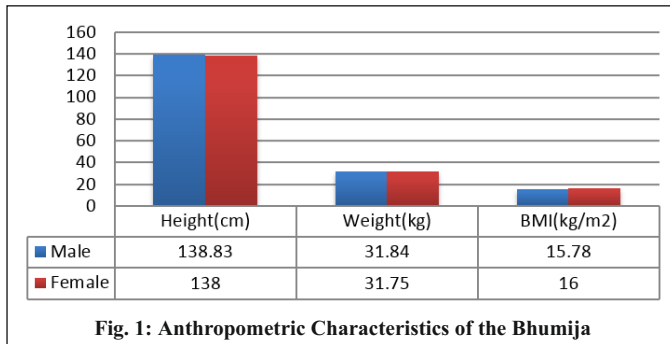


Fig. 1: Anthropometric Characteristics of the Bhumija

Table.2 revealed the participants of the nutritional status, In case of males, 79 (28.7%) were classified as CED III, 18 (6.5%) CED II, 16 (5.8%) CED I and 20 (7.3%) were normal. In case of females 75 (27.3%) were CED III, 27 (9.8%) CED II, 17 (6.2%) CED I, and 23 (8.4%) were normal.

Table 2: Nutritional Status of the Bhumija Males and Females

Nutritional Status	BMI (kg/m ²)	Male (n-133)	Female (n-142)
		Frequency (%)	Frequency (%)
CED III	<16.0	79(28.7%)	75(27.3%)
CED II	16.0-16.9	18(6.5%)	27(9.8%)
CED I	17.0-18.4	16(5.8%)	17(6.2%)
Normal	18.5-24.9	20(7.3%)	23(8.4%)
Over weight	≥25.0	--	--
Total	< 18.5	133(48.4%)	142(51.6%)

df=3, p<0.001

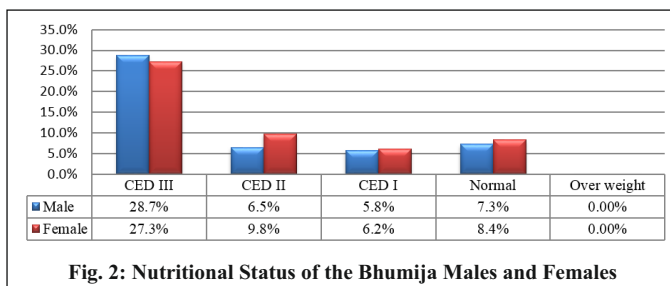


Fig. 2: Nutritional Status of the Bhumija Males and Females

Table 3: Comparison and Mean BMI and Prevalence of CED among Various Tribes of Odisha

Community	Mean BMI (kg/m ²)		CED Prevalence (%)		Study area (State)	Reference
	Male	Female	Male	Female		
Bhumija	15.7	16.0	48.4	51.6	Odisha	Present study
Santal	19.5	18.1	55.0	52.5	West Bengal	Mukhopadhyay 2010
Birhor	20.5	20.2	19.4	33.3	West Bengal	Das et al. 2013
Mahalis	19.9	17.9	42.2	63.6	West Bengal	Ghosh & Bose 2017
Oraon	18.8	19.3	47.0	30.7	Orissa	Beck & Mishra, 2010
Savar	18.9	19.3	38.0	49.0	Orissa	Bisai & Bose, 2012

Sabar	19.4	18.0	52.0	65.0	West Bengal	Bhandari et al. 2019
Bhumij	18.6	--	52.3	--	West Bengal	Ghosh & Bose 2015
Munda	19.35	--	35.8	--	West Bengal	Das & Bose 2010
Oraon	19.46	--	37.5	--	West Bengal	Bose et al. 2011
Oraon	18.0	--	53.1	--	Jharkhand	Chakra borty & Bose, 2008
Tangkhu Naga	--	21.2	--	16.2	Manipur	Mungreiphy, et al, 2012
Bhotias	19.5	--	45.3	--	Uttarakhand	Kapoor et al, 2012
Sabar	19.4	18.0	52.0	65.0	West Bengal	Bhandari et al.2019

DISCUSSION:

The nutritional health concerns of India's vast tribal population are caused by ethnic groupings that are close to conflating socioeconomic, social, and malnutrition diversity, which is widespread among the tribal people (Deka, 2011). Many studies on their socioeconomic and nutritional status have been undertaken in the past. The studies revealed a significant relationship between them. In the Mymensingh district, the Garo people's nutritional situation is dire. Underweight, normal weight, overweight, and obese people made up 30%, 46 percent, 16 percent, and 8% of the population, respectively. Due to a lack of resources and ignorance (Naser, 2015), owing to their traditional customs and poor literacy levels, a section of tribal people is particularly vulnerable to malnutrition. According to a separate study, Saharia's low socioeconomic status is reflected in their low educational and income status. The higher prevalence of CED and overweight in guys compared to females reflects their superior understanding of BMI in relation to their environment. It was also discovered that Saharia females had a greater rate of undernutrition based on MUAC. In the present study, we discovered a link between nutritional status and socioeconomic level as well. Men were mostly working in agriculture (39.3%), whereas women (30.9%). There was a large gender divide. We also discovered that malnourished females had a greater rate of malnutrition than males in this study.

The above table reveals that the higher prevalence of CED and overweight in males as compared to females reflects their superior understanding of BMI in relation to their environment. In the present study, we revealed that the relation between BMI and CED level as well. The prevalence of CED (%) and mean BMI kg/m² in India's major tribal populations are shown in Table 8. In the case of males, the mean BMI was larger in Santals, and Birhors of West Bengal, as seen in the table. Females had a higher mean BMI than West Bengal Birhors. In the case of males, WHO guidelines indicate that CED is prevalent among Santals (Mukhopadhyay 2010), Birhor (Das et al. 2013), Mahalis (Ghosh & Bose 2017) of West Bengal, Oraons (Beck & Mishra, 2010) of Orissa, Savar (Bisai & Bose, 2012) of Odisha. On the other hand, have a very high frequency of CED (40 %). According to these criteria, Sabars (Bhandari et al.2019) from West Bengal, as well as Bhumija from the present study, were in a catastrophic state. As a result of this research, it was found out that the CED percentage in females was higher than in males among the Bhumija tribe of Mayurbhanj district, Odisha.

CONCLUSION:

In conclusion, the present study visibly demonstrated the necessity to recognize, alter, and restructure assets for the indigenous community according to their needs. The intended improvement initiatives and the health needs of ethnic populations must be determined while maintaining their socio-cultural traditions and habitat in mind. The prevalence of under nutrition based on CED and BMI was high, indicating a critical nutritional state, according to World Health Organization (WHO) guidelines. To alleviate this ethnic group's nutritional stress, an immediate and appropriate nutritional participation programme must be established. To improve their health conditions, a need-based socio-economic intervention programme should be initiated.

RECOMMENDATION:

As a result, we recommend that comparable research be conducted to find out the frequency of under nutrition among Bhumijas from other regions, particularly in rural areas. This research will aid in the generation of fresh data that may be used to analyse the prevalence of malnutrition on a local.

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